LETTERS TO THE EDITOR.

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Butterfly Migration in Relation to Mimicry.

THE last paragraph in Prof. Poulton's letter in NATURE of June 13, referring to Mr. Swynnerton's experience that adult birds possess "a very fair knowledge of the main types of pattern and relative edibility of the local butterflies," reminds me of the only occasion on which I have seen a butterfly attacked by a bird during five years' observation in this district.

While walking in the observatory compound my attention was attracted by a Lycænid butterfly of an unfamiliar species, probably a migrant from a much lower elevation (the observatory is situated in the Palni Hills at an altitude of 7700 ft. above sea-level). I was watching the mazy flight of the insect in the expectation that it would settle, when I noticed a shrike sitting on a post near by, also observing it attentively. He evidently had a fair knowledge of the local butterflies, and considered this to be something new and worth eating, for he suddenly jumped from his perch and very cleverly caught the butterfly on the wing, a surprising feat for a bird having a rather clumsy build and heavy flight. Apparently he swallowed the insect entire, for I could discover no wings at the spot afterwards.

The general immunity of butterflies and day-flying moths from attack by insectivorous birds is as strikingly evident here as it is in England or America, and seems a serious difficulty in the way of accepting the Batesian theory of mimicry. Not only do the birds of this district pay no attention to the common butterflies, but the latter seem to despise the former. I have even seen a small bird frequenting the bracken of the uplands chased for a considerable distance by the vigorous and somewhat aggressive *Argynnis castetsi*!

In contrast with this immunity I have found that nocturnal moths, if forced to take long flights during the daytime, are very liable to attack, and in these circumstances stand a very poor chance indeed of reaching a haven of refuge. The watchful birds seem ever on the alert to snap up strangers.

It would seem, then, that unfamiliar lepidoptera are much more liable to attack than the common everyday kinds. May it not be that the real danger to a species occurs during migrations, and that mimetic resemblances may afford a real protection during such flights? In entering a new district a mimetic species would be immune from attack if the birds were familiar with the model, even if the latter were not unpalatable, while, on the other hand, unpalatable species migrating would be liable to attack if unfamiliar to the local birds.

In this district annual migrations occur across the Palnis during October and November of a considerable number of species from the plains, including the following mimics and models:—*Hypolimnas bolina, H. misippus, Euploea core, Danais plexippus, D. septentrionis, D. limniace, Papilio polytes, P. hector.* In these migrations it is noticeable that the mimetic species, *H. bolina* and *H. misippus*, are very liable to have torn wings, suggesting attack by birds, and it appears that the models as well as mimics are also sometimes attacked. An instance has been recorded by H. Leslie Andrewes (Journal of the Bombay Natural History Society, xx., 850), who found evidence of systematic onslaught by King crows (Dicrurus) on Danaids and Euplœas, also *H. bolina* ♀ and *Catopsilia crocale*. This was near Ootacamund in the Nilgiris in October. All the species mentioned by him are migrants from the plains, and I believe do not normally inhabit the Nilgiri plateau, although commonly seen at that particular season. There is a significant absence in the list of the very abundant and indigenous *D. nilgiriensis*, which would be well known to the local birds.

P. hector (the model of one form of *P. polytes* ♀) appears to be specially liable to attack when migrating across the Palnis, if one may assume that wings on the ground are good evidence of attack by birds.

This liability to attack of migrants passing over the Palnis or Nilgiris appears, however, not of much significance when large areas are considered. A mimic such as *H. misippus* ♀ possesses, so to speak, a passport over the whole of the plains of India, Persia, Arabia, &c., owing to its close resemblance to the very abundant and widely distributed plains butterfly *D. chrysippus*. The facility thus afforded for dispersal would surely be an important factor in the life of the race.

J. EVERSHED.

Kodaikanal Observatory, South India, July 9.

Parallel Mutations in Oenothera biennis.

IN a culture of a particular strain of *O. biennis*, L., a series of forms has been observed which constitute a parallel series to the well-known mutants from *O. Lamarckiana*, Ser. *O. biennis*, unlike *O. Lamarckiana*, has small flowers and a short style, rendering the flowers rather strictly self-pollinating. The particular race in question I received from the Madrid Botanical Garden. It has typical *O. biennis* flowers, as mentioned above, but the foliage closely resembles that of *O. Lamarckiana*. These plants were grown, to the number of 131 this year, at the John Innes Horticultural Institution, Merton, in connection with my other Oenothera cultures, which number in all more than 10,000 individuals.

While in the majority of the plants in this culture the foliage resembles *O. Lamarckiana* or *O. rubrinervis*, several have leaves corresponding to the mutants, there being six *laevifolia*, one *lata*, and possibly one *gigas*. With larger cultures probably other mutant types will also be found. The peculiar characters of the *lata* foliage are even correlated with sterility of the anthers, as in the *lata* from *O. Lamarckiana*, though the flower otherwise is that of *O. biennis*.

Though the foliage characters of these *O. biennis* forms are not identical with those of the Lamarckiana mutants, yet they differ from each other in corresponding ways, and thus form a parallel series.

The interesting question as to the origin of this strain of *O. biennis* cannot be answered at the present time. Even if they originated through crossing (as seems probable), their flowers are now self-pollinating, so that each individual, with occasional exceptions, must represent a "pure line." The most probable assumption is that, as in the case of *O. Lamarckiana*, the aberrant forms all originated from one type having Lamarckiana-like foliage. Of the mutant types in this culture, the *O. biennis lata* at least has evidently taken its origin directly from one of the other types, since it produces no pollen. It has probably arisen through such irregularities in the distribution of chromosomes during the meiotic processes as I have described for the *O. Lamarckiana* series of forms, and the presumption is that some of the other mutant types have had a similar origin. This is in harmony with my hypothesis that the mutation phenomena in *O. Lamarckiana* are not due merely to hybrid splitting,

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but are an indirect result of the germinal instability occasioned by crossing in the ancestry.

It is to be hoped that further study of this new series of forms, with particular regard to the manner of origin of the mutant types, together with crossing experiments with the *O. Lamarckiana* series, will throw further light upon the nature of the mutation processes in Oenothera. R. R. Gates.

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William Herschel and his "Desertion."

In the valuable discourse on Sir William Herschel delivered at the Royal Institution on April 26 by Sir George Darwin, the well-known story of the desertion of the young bandsman from the Hanoverian Guards has been alluded to (Nature, August 15, p. 620). A week or two after the delivery of this discourse the "Scientific Papers of Sir William Herschel" were published by the Royal Society and the Royal Astronomical Society, and in the introduction to that work there is given a detailed account of how Herschel left the army, written by himself and corroborated by the still existing official discharge, signed by the colonel of the Guards in 1762. As many readers of Nature may not come across that work, it may be of use to give a summary of the facts here.

After the battle of Hastenbeck (July, 1757) young Herschel (eighteen years of age) left the army and went home to Hanover, on the suggestion of his father. But on his arrival there he found that as a noncombatant he was liable to be pressed into the army at any moment. He therefore at once (or very soon) returned to his regiment, putting on his uniform again (not taking it off, as stated) when he had passed the sentries at Herrenhausen. He remained with the army till the following September, when he finally left it, as his father pointed out to him that there could be no objection to his doing so, since he had not taken the oath when he joined the band as a boy of fourteen. He then went straight to Hamburg without going home first, and proceeded to England, where he had spent five or six months in the previous year and where he wished to settle. In March, 1762, he obtained a formal discharge, which is now printed in my above-mentioned introductory memoir. The story, originally published by Airy on the authority of the Duke of Sussex, that George III. in 1782 handed Herschel a formal "pardon," must therefore have been due to some misunderstanding or other.

J. L. E. Dreyer.

Armagh Observatory, August 23.

The Disintegration of Metals at High Temperatures.

During experiments on the disintegration of metals, particularly those which are not supposed to combine directly with oxygen, such as certain metals of the platinum group, I have found the disintegration to be due to the direct formation of an oxide. The loss of weight of a hot platinum wire, for instance, is zero in nitrogen, in hydrogen, and in a vacuum. By means of an expansion apparatus, all metals tried are found to give nuclei when oxygen is present, but not when it is absent, either in other gases or in a vacuum. The occluded gases come off in a vacuum in molecular aggregations, but there is no evidence that they bring particles of the metal with them. The loss of weight cannot be due to volatilisation, as it diminishes with diminution of pressure of surrounding oxygen.

By weighing experiments, the weight of oxygen absorbed and of platinum lost correspond to the formation of a hitherto unknown oxide of platinum. This oxide is deposited upon the walls of the containing vessel as a black powder; on being heated it turns to the metal, producing a platinum mirror. Microscopic examination does not reveal any evidence of crystals, either in the black powder or in the mirror. If, however, a piece of glass having such a deposit, and having been heated in different places, is boiled in aqua regia, the parts where the metallic mirror has been formed by heating become clear very quickly, whilst the black powder, where it has not been heated, remains unaffected. J. H. T. Roberts.

University of Liverpool, August 20.

September Meteor-showers.

The following meteor-showers become due during the month of September:—

Epoch September 4, 19h. 30m. (G.M.T.), nineteenth order of magnitude. Principal maximum, September 4, 6h. 10m.; secondary maxima, September 3, 7h. 40m., and September 4, 18h.

Epoch September 7, 3h. 30m., approximately first order of magnitude. Principal maxima, September 6, 2h. 15m., and September 7, 21h. 5m.; secondary maxima, September 7, 12h. 30m., and September 8, 20h. 40m.

Epoch September 7, 2h., approximately first order of magnitude. Principal maximum, September 6, 6h. 30m.; secondary maxima, September 5, 11h. 20m., and September 6, 23h. 55m.

Epoch September 9, 15h. 30m., approximately seventeenth order of magnitude. Principal maximum, September 7, 22h. 50m.; secondary maximum, September 9, 13h.

Epoch September 9, 14h., sixteenth order of magnitude. Principal maximum, September 8, 10h. 15m.; secondary maximum, September 8, 2h. 35m.

Epoch September 12, 20h., thirty-fifth order of magnitude. Principal maxima, September 9, 18h. 25m., and September 11, 14h. 30m.

Epoch September 8, 17h. 30m., approximately seventeenth order of magnitude. Principal maxima, September 9, 22h. 45m., and September 11, 18h. 45m.; secondary maximum, September 9, 8h. 34m.

Epoch September 16, 8h., sixteenth order of magnitude. Principal maxima, September 13, 10h. 30m., and September 15, 6h. 35m.; secondary maximum, September 15, 14h. 30m.

Epoch September 14, 22h. 30m., eleventh order of magnitude. Principal maximum, September 13, 22h. 25m.; secondary maxima, September 12, 12h. 50m., September 13, 18h. 30m., and September 14, 8h. 50m.

Epoch September 16, 9h. 30m., twelfth order of magnitude. Principal maximum, September 14, 16h. 50m.; secondary maximum, September 16, 4h. 55m.

Epoch September 15, 4h. 30m., tenth order of magnitude. Principal maximum, September 14, 20h. 45m.; secondary maximum, September 13, 0h. 40m.

Epoch September 14, 15h., eleventh order of magnitude. Principal maxima, September 15, 18h. 25m., and September 17, 14h. 25m.; secondary maximum, September 17, 2h. 35m.

Epoch September 19, 21h. 30m., approximately seventh order of magnitude. Principal maximum, September 21, 2h. 35m.; secondary maxima, September 20, 8h. 45m., and September 21, 6h. 30m.

Epoch September 21, 9h. 30m., third order of magnitude. Principal maximum, September 22, 22h. 35m.; secondary maxima, September 23, 2h. 30m., and September 24, 22h. 25m.

Epoch September 25, 15h. 30m., fourteenth order of magnitude. Principal maximum, September 23

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